



**Queensland University of Technology**  
Brisbane Australia

This is the author's version of a work that was submitted/accepted for publication in the following source:

Williamson, Amy, Smyth, Tanya L., Sheehan, Mary C., & Siskind, Victor (2011) Medications and driving : community knowledge, perceptions and experience. In *Australasian Road Safety, Research, Policing and Education Conference*, 6-9 November 2011, Perth Convention & Exhibition Centre, Perth, WA. (In Press)

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## **Medications and driving: community knowledge, perceptions and experience**

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**Keywords:** prescription medications; driving performance; community perceptions

**Abstract:** There is increasing awareness of the potential for any medication that acts on the central nervous system to impair judgement and motor functioning, including driving performance. This paper reports community knowledge, perceptions and experience in relation to driving while taking medications. A community-based survey (n=316) revealed that of those who had taken any type of medication in the last 7 days (n=193), a quarter (24%) had driven while taking a medication that they thought could affect them. Of those who drove for work, a quarter (26%) of the respondents reported that they had changed or stopped their work-related driving because they were taking a medication that displayed a warning label about driving. Outside of work, a third (35%) of the total number of respondents reported that they had done so. Of those who had taken any type of medication in the last 7 days, 62 were taking on a daily basis one or more medications classified as being likely to have a warning label about driving, such as sedatives, tranquilizers, antidepressants, analgesics and anticonvulsives. This paper will examine community knowledge, perceptions and experience surrounding medications and driving with particular reference to those persons who were taking drugs with a warning label, and the barriers to following such warnings.

## **Introduction**

The potential for medications to impair driving is an international road safety concern which has arisen due to the frequency of motor vehicle use and the recognition of the potential for any medication that acts on the central nervous system to impair driving performance. Knowledge of the effect of medicinal drugs on driving risk has been largely derived from epidemiological and experimental studies. Results from such studies have found increased risk for users of benzodiazepines, sedatives, antihistamines, and tricyclic antidepressants, with some effects found to be exacerbated when the medication is combined with alcohol (Barbone et al., 1998; Drummer et al., 2004; Mura et al., 2003; Neutel, 1995, 1998; Ray, Fought & Decker, 1992). This is of concern when considering the results of the 2007 National Drug Strategy Household Survey which showed that the majority of Australians aged 14 years and older had consumed alcohol over the past year (AIHW, 2008). Studies have demonstrated a significant increase in culpability of drivers under the influence

of benzodiazepines even at therapeutic concentrations (Longo et al., 2000a; 2000b). This is of particular concern when benzodiazepines are reported as being the most widely prescribed psychotropic medication in Australia, with diazepam, temazepam and oxazepam accounting for nearly 4% of all prescriptions by General Practitioners (Wain, Khong & Sim, 2007). Benzodiazepine use is known to increase with age, with chronic use found to be more prevalent among the elderly (Jorm et al., 2000; Simon, Vonkorff, Barlow, Pabiniak & Wagner, 1996).

Recent findings by Mallick, Johnston, Goren and Kennedy (2007) indicate that there are very low levels of knowledge within the driving population of the effects of medications on driving, and of how much time should elapse following analgesics, benzodiazepines and prescription stimulant use before it is safe to drive. Compliance with medication instructions and cautionary advice is necessary to minimise crashes resulting from either the effects of the medication, illness, or unstable doses (Lococo & Staplin, 2006). The current Queensland medication warning system mandates the use of ancillary labels on medications that may cause drowsiness. At the time of data collection, the label shown in Figure 1 was one of the mandatory labels used in QLD and according to the Australian Pharmaceutical Formulary and Handbook (PSA, 2009), it is used for medicines whose primary or secondary effect is sedation. Recent changes to QLD legislation mean that the display of ancillary warnings about potential driving impairment are no longer required if the warnings are visible on the manufacturer's pack (Queensland Government, 2011). Researchers have suggested that increasing the noticeability of medication warnings may improve attitudes and adherence to warning advice about driving while taking certain medication (ICADTS, 2001). Current research suggests there may be potential to improve Australian medication warning and labelling systems to improve driver awareness, attitudes and compliance with medication warnings (Ley, 1995; TGA, 2002). A greater understanding of community attitudes, knowledge and behaviour surrounding the effects of medications on driving, and the barriers to adhering to warnings is needed.

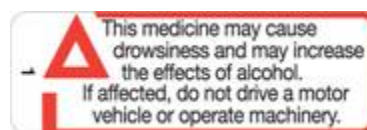


Figure 1 Mandatory warning label used in QLD

The purpose of this paper is to report our investigation, using self-report data, of community knowledge, perceptions and experience in relation to the impact of medications on driving and self-assessing personal impairment from taking medications. Based on previous research, those medication classes commonly identified as being potentially impairing and thus likely to carry a warning against driving, were of particular interest. For this paper, these were restricted to sedatives or sleeping pills, tranquilizers or other anti-anxiety, antidepressants, antihistamines or anti-allergic, analgesics for pain, anticonvulsives, antibiotics and other medications for mental health (Alvarez and Del Rio, 2000; Walsh et al., 2004; Barbone et al., 1998; Drummer et al., 2004; Mura et al., 2003; Ray, Fought & Decker, 1992). The barriers to complying with current warning labels as well as the reported reasons for compliance were also examined.

## Method

A telephone survey was administered by two research assistants using the online institutional survey software. The survey took, on average, 30 minutes to complete and included:

- socio-demographic characteristics;
- employment characteristics;
- medication use;
- perceived susceptibility to impairment;
- physical and cognitive signs used to determine 'affected' status;
- relative weighting of signs of impairment in making judgements about continuing driving or machinery use; and
- past behaviour regarding driving or using machinery when 'affected'.

### Sampling method

A random sample of 690 potential participants was drawn from a representative state road safety survey panel. This is a large panel of participants across Queensland who have agreed to be recruited selectively to respond to surveys on key ongoing core issues. The selection criteria for the survey specified that participants must drive regularly and hold a valid open license. An advisory letter and hard copy of the survey were first mailed to participants, with the telephone survey then taking place within the following two weeks.

### Respondents

A total of 316 respondents completed the telephone survey (response rate of 60%), 40% males and 60% females. Age ranged from 18-25 to 75+ years, with the majority of participants falling into the 46-56 year age bracket (30%) and 57-65 year age bracket (29%). Under half (43%) worked on a full-time basis and a further 33% on a part-time basis. Thirty percent of respondents reported secondary school as their highest education level, 29% reported a Certificate or Diploma and another 29% a University qualification.

## Results

Results are based on the 316 respondents who completed the survey.

### Driving patterns

Most respondents drove on a daily basis (79%), with those remaining driving a few times a week. Most (86%) were car drivers for work and of those who worked full or part-time, 44% reported needing to drive or ride to and from work, 17% for work activities and 39% both to and from work and for work activities. The average number of hours spent by the group driving or riding per week was 10.7 hours (range=.05-70hrs).

### Medication use

Almost two thirds (62%, n=193) of all respondents reported taking at least one medication in the last 7 days. Of these, 62 were taking one or more potentially impairing medications on a daily basis and 61 were taking one or more potentially impairing medications on an occasional basis in the last 7 days (with 17 respondents taking one or more potentially impairing medication on a daily basis *and* on an occasional basis in the last 7 days).

The majority of respondents (85%, n=266) reported taking at least one medication in the last 12 months. Of these, 54 had taken one or more potentially impairing medications on a daily basis over the year while 181 had taken one or more potentially impairing medications on an occasional basis in the last 12 months (with 30 respondents reporting to have taken one or more potentially impairing medications on a daily basis *and* on an occasional basis in the last 12 months).

### Alcohol and Other Drugs

Respondents were asked how often they consumed alcohol and had ever consumed other drugs. Few reported having ever consumed cannabis (18), heroin (3), ecstasy (4) or cocaine (4). Alcohol was reported to be consumed daily by 16% of respondents and occasionally by a further 68%.

There was a high level of agreement with regard to the following statements:

- Driving under the influence of alcohol is dangerous (98%)
- Using machinery under the influence of alcohol is dangerous (98%)
- Alcohol can increase the effects of certain medications on driving (98%)
- Alcohol can increase the effects of certain medications on using machinery (98%)

### Knowledge

Approximately half of all respondents (47%) reported that they could *always tell* if their medication was affecting their driving. A further 38% reported that they could *sometimes tell*, 12% were *unsure* and 3% reported that they *could not tell*. Of those who had taken a potentially impairing medication either daily or occasionally in the last 7 days (n=106), 55% reported that they could *always tell*. A very small proportion of the sample (3%) could not tell if they were affected.

There was a high level of agreement with regard to the following statements:

- Discontinuing any medication without the advice of your doctor can be harmful to your health (87%)
- A sudden discontinuation of your medication can be harmful to your health (84%)
- If you take more than the prescribed dose of a medication, you are more likely to have an accident (80%)
- Combining medications can increase the effects of medications on driving (90%)

Approximately half (52%) of respondents *disagreed* with the incorrect statement; "The risk of having an accident is weaker at the start of treatment than during long term treatment".

### Community Perceptions

Respondents were asked to rate in general, how risky driving is thought to be. On a scale of 1-10 (1 being not risky at all and 10 being very risky) most respondents rated this in the mid-scale range (mean=5.7).

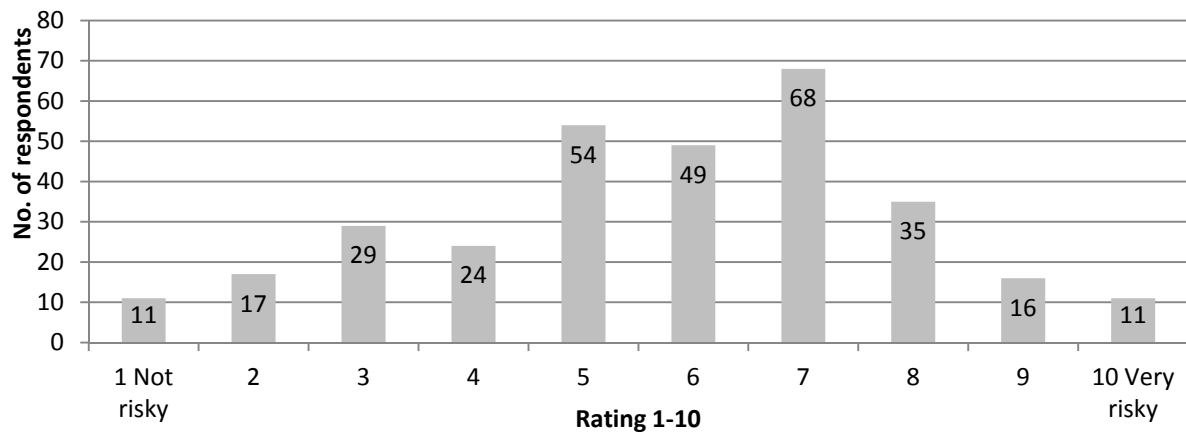


Figure 2 Participant rating of how risky driving is thought to be in general

Respondents were then asked to rate their own chance of being in a crash either caused by someone else or themselves. On a scale of 1-10 (1 being very low and 10 being very high), most respondents rated this in the mid-scale range (mean=4.5).

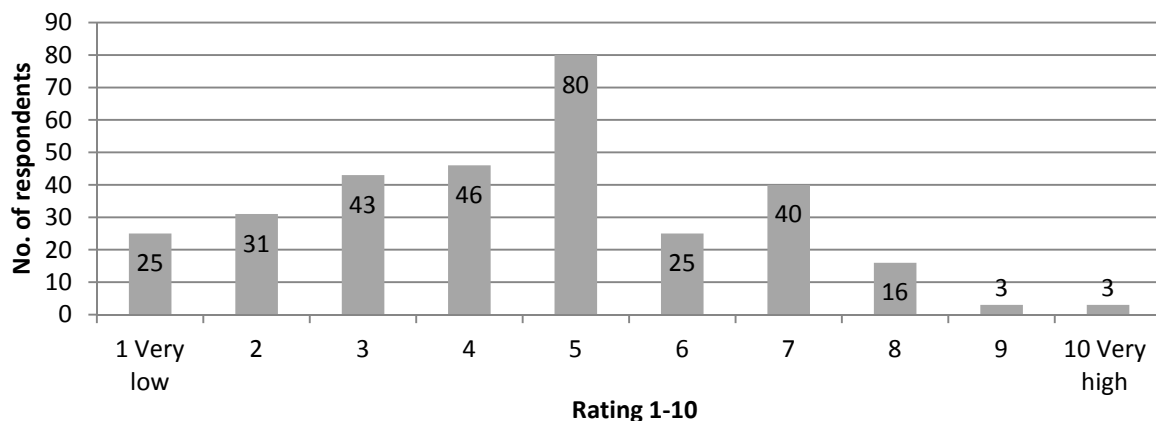
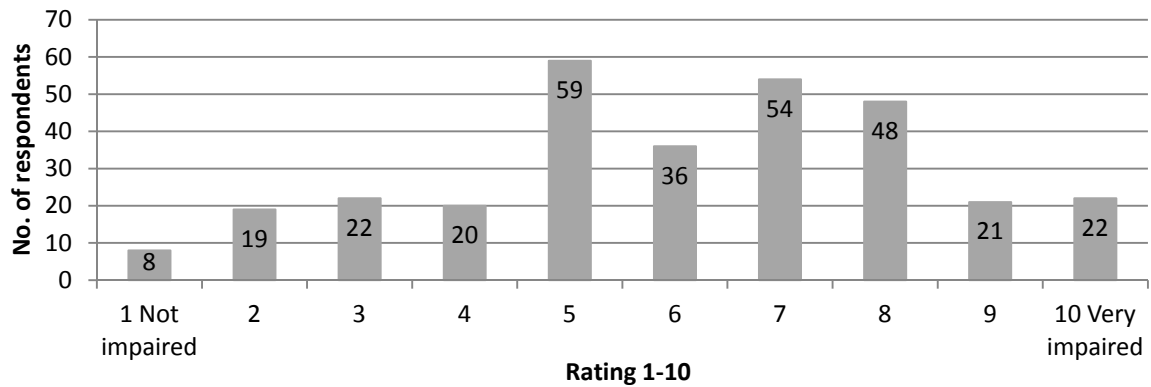


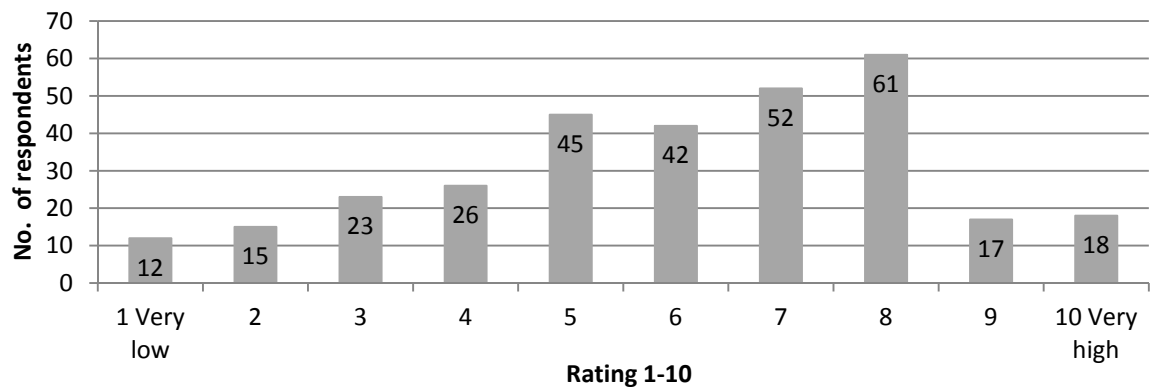
Figure 3 Participant rating of personal chance of being in a crash

Respondents were asked to rate how impaired they thought their ability to drive would be after taking a medication that displayed the warning about driving shown in Figure 1. On a scale of 1-10 (1 being not impaired and 10 being very impaired), most rated this in the mid-high range (mean=6.1).



**Figure 4 Participant rating of driving impairment if taking a medication with a warning**

They were also asked to rate their chance of having a crash after consuming a medication that displayed a warning about driving. On a scale of 1-10 (1 being very low and 10 being very high), most rated their chance of having a crash in the mid-high range (mean=6.1).



**Figure 5 Participant rating of chance of having a crash after consuming a medication with a warning**

Lastly, respondents were asked to rate their chance of having a crash after consuming a medication that displayed a warning about driving, when affected by alcohol. The affect of alcohol increased respondents rating of their chance of having a crash, with most rating their chance of having a crash as high or very high (mean=8.1)

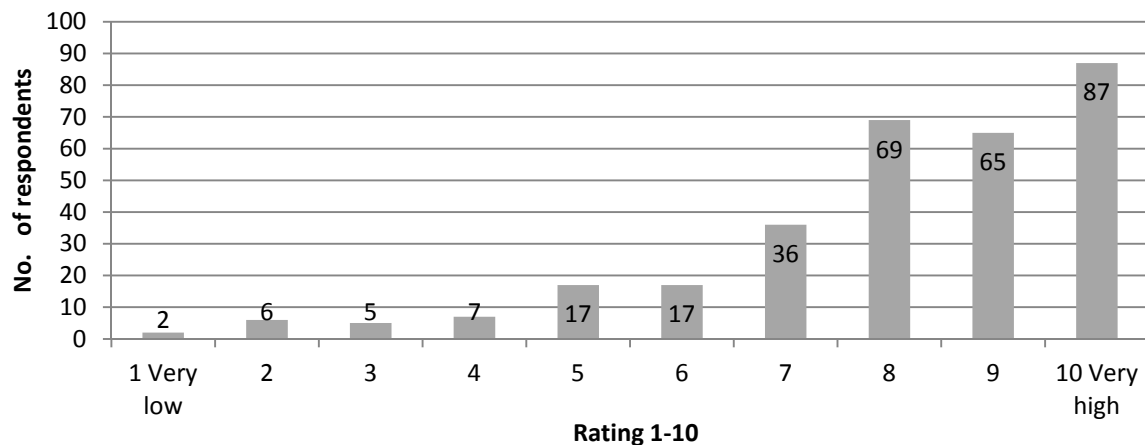


Figure 6 Participant rating of chance of having a crash after consuming a medication with a warning, when affected by alcohol

### Experience

The majority of respondents (74%) reported that they had never driven while taking a medication that they thought could affect them and around one quarter (24%) reported that they had. Of those who had taken at least one medication in the last 7 days, 74% reported that they had never driven while taking a medication that they thought could affect them and a quarter (24%) reported that they had. Of those who had taken at least one medication in the last 12 months, 71% reported that they had never driven while taking a medication that they thought could affect them and 26% reported that they had.

#### *Medication warnings*

The majority of respondents (96%) had already seen a warning about driving on certain medication boxes. When asked if they had ever asked their doctor or pharmacist about the possible effects of their medication on their driving, 40% of the total number of respondents reported that they had. Of these, approximately half (57%) reported having followed this advice for their work-related driving and most (86%) had followed the advice for driving outside of work.

#### *Work-related driving behaviour*

Of the total number of respondents who drove for work, when asked if they had ever changed or stopped their work-related driving because they were taking a medication with a warning, 26% reported that they had, 32% reported that they had not, and the remaining 42% reported that it did not apply or were unsure.

Of those who had taken one or more potentially impairing medications either daily or occasionally in the last 7 days (n=106), 28% said that they had changed or stopped their work-related driving. Of those who had taken one or more potentially impairing medications either daily or occasionally in the last 12 months (n=205), 25% said that they had changed or stopped.

Reasons for changing or stopping their work-related driving included:

- The physical effect that it had, i.e. drowsiness, vision impairment, light headedness, fatigue



- The advice given or the warning label
- Company policy
- Being able to get a lift with someone else
- Feelings of safety/ not wanting to take the risk- for oneself and for others i.e. "Didn't wish to put myself or anyone else in more danger"
- Not being covered by insurance if an accident had occurred

Reasons for not changing or stopping their work-related driving included:

- Only taking the medication at night so no effects during the day
- Didn't think the medication was having an effect
- Felt that the effect was manageable
- Didn't think about it
- If on sick leave then no need to drive
- Feelings of having to stay at work, i.e. "Had to work, "had to pay the bills", and "had to get the job done".

#### *Non work-related driving behaviour*

Of the total number of respondents, when asked if they had ever changed or stopped their non work-related driving because they were taking a medication with a warning, a third (35%) responded that they had.

Of those who had taken at least one medication in the last 7 days (n=193), 37% had changed or stopped their non work-related driving and of those who had taken one or more potentially impairing medications either daily or occasionally in the last 7 days (n=106), 41% said that they had changed or stopped their non work-related driving. Of those who had taken one or more potentially impairing medications either daily or occasionally in the last 12 months (n=205), 39% said that they had changed or stopped their non work-related driving.

Reasons for changing or stopping their non work-related driving were similar to those for work-related driving. Having someone who could drive for them and having to drive long distances were the only additional reasons provided. Reasons for not changing or stopping their non work-related driving were also similar to those for work-related driving. Having commitments, needing to get things done and not always having someone else to drive for them were comparable to the feelings of needing to 'get the job done' and 'pay the bills' at work. One interesting additional reason provided for not changing or stopping their non work-related driving was actually altering or stopping the medication use so they could continue to drive.

## **Discussion**

Importantly, this study firstly highlights that this is a community wide issue affecting, in this sample, approximately two-thirds of the drivers - those who had taken at least one medication in the last 7 days and over half of these involving a medication type likely to warn against driving. Of further importance is the 'moderate' nature of both the reported perceived risk of driving in general and the chance of being involved in a crash either caused by someone else or by them self, and the perceived rating of driving impairment if taking a medication with a warning label.

While the majority of respondents had seen a warning label on certain medication boxes, responses were divided when it came to following the advice given to them by a doctor or pharmacist. Of those who had sought advice about the effects of their medication on their driving, a much higher proportion reported having followed this advice for their non work-related driving, than for their work-related driving. A similar pattern was found when respondents were asked whether they had ever changed or stopped their non work-related and work-related driving because they were taking a medication that carried a warning, again with a higher proportion reporting having changed or stopped their non work-related driving than their work-related driving.

These findings suggest that while company policies and insurance issues may deter people in some cases from driving at work, when taking a potentially impairing medication, the primacy of work and/or financial pressures are holding people back from taking the necessary sick leave or advice when needed. As one respondent reported, they *“had to pay the bills”* and *“get the job done”*. Outside of work, family pressures and time commitments may be forcing people to keep driving, for lack of a more viable alternative. One person reported that they *“needed to get things done”* and that *“others are not always available”* to help. Notably, for some prescription medications, the minimum prescription time is 6-12 months, making it unfeasible to refrain from driving for such an extended period of time. This raises the question of alternative prescribing by the doctor so that the chosen medication is appropriate for the individual and when needed, greater responsibility placed on the consumer to find alternative transport if the required medication has the potential to impair driving. Of further concern is the perceived self-confidence when it comes to judgement of personal impairment, the alteration or ceasing of medication use to allow for driving and the perceived self-manageability of medication use. As one person reported; *“if I’m feeling alright, and not faint headed, I just do what I have to do”*.

As well as the barriers to compliance, reasons *for* changing or stopping driving were examined. Results revealed that many respondents considered their own personal safety as well as that of other road users, and not wanting to risk having an accident, as important factors. Some of the factors identified as being looked for when judging their impairment included being told by their partner, friend or family members, noticing an effect during other activities and using the reactions of other drivers and passengers. These reasons for changing or stopping driving are important to consider for future research in this area.

As found in previous studies, this paper shows uncertainty and lack of community knowledge surrounding the effects of medications on driving. While most agreed with statements such as “combining medications can increase the effects of medications on driving”, only half reported that they could *always* tell if they were affected. This uncertainty draws upon issues such as tolerance, with only half of respondents disagreeing with the statement “the risk of having an accident is weaker at the start of treatment than during long term treatment”. Encouragingly, the deleterious effects of alcohol on driving were overwhelmingly acknowledged by respondents, as was the perception that alcohol can increase the effects of certain medications on driving. Given the relatively high prevalence of alcohol consumption in Australia, as shown in the AIHW study, this is an important finding. As one respondent said; “If you have a zero for alcohol then you should take it [medication use] seriously”. The ongoing initiative in securing a cultural change to drink-driving in our society, where peer

intervention and support is encouraged, may offer some valuable insights into achieving change in the area of medications and driving. Given the age range of the survey sample, the finding that alcohol is consumed on a daily basis by 16% of respondents is also consistent with the AIHW study that reported daily alcohol consumption by between 9-16% of those in the 40-49, 50-59, and 60+ age brackets.

## Conclusion

This study highlights the uncertainties and lack of community knowledge surrounding medications and driving. Work and personal pressure and commitments and the perceived manageability and acceptability of self-judgement of impairment are important factors to consider in future research. Due to the increased prescribing rates of some prescription medications and the perceived impracticality of refraining from driving for long periods of time, it may be important for future research to focus on providing more specific guidelines regarding the effects of these medications on driving. The effectiveness of other systems such as the highly consultative French model may be worth investigating. Ways to increase warning label effectiveness and public awareness and knowledge are also important areas for future research. Empirical information relating to the effects of various doses, age, body mass and time of taking medication is needed. Driving simulator studies have great potential to benefit this area of research in terms of validating the effects of medications on driving performance and people's ability to self-judge impairment. Limitations relating to survey research such as interviewer and self-report bias and the use of a road safety panel-based sample are acknowledged. The potential for underreporting of the use of some prescription medications, alcohol and other drug use, and of those who drive when affected by their medication is important to note.

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